



# TESLA: CURFEW FOR A CORPORATE TEENAGER?

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# In the news again..

- A news magnet: Tesla is back in the news, though this time for all of the wrong reasons.
- Distractions galore: From Musk's Twitter escapades with the SEC, to talk about electric lawn blowers to concerns about a debt death spiral, the company has managed, yet again, to get in its own way and this time it has paid a price in the market, as its stock price tests lows not seen in a couple of years.

# Looking back: My Tesla valuation in June 2018

Tesla						
An Optimistic Story						
Tesla will create a niche for itself as a high-end auto company, delivering \$100 billion in revenues in year 10, while also delivering on profitability (with margins in the 75th percentile of auto firms) and raising enough capital to cover its large reinvestment needs for the much of the next decade. While Tesla's operating risk will move towards average over time, its debt burden puts it at risk of default, albeit small (5%), in the near future.						
The Assumptions						
	Base year	Years 1-5	Years 6-10		After year 10	Link to story
Revenues (a)	\$ 12,471	32.00%	3.00%		3.00%	Eight-fold increase in revenues; about 1.6 million cars sold in year 10.
Operating margin (b)	-11.37%	-11.37%	10.00%		10.00%	At the 75th percentile of global auto
Tax rate	25.00%	25.00%	25.00%		25.00%	Global average tax rate, after NOLs used up
Reinvestment (c)		Sales to capital ratio 2.00		RIR =	30.00%	Invest more efficiently than typical auto firm.
Return on capital	-8.71%	Marginal ROIC = 22.14%			10.00%	Brand name power generates excess returns
Cost of capital (d)		8.29%	7.50%		7.50%	Converge on average risk firm over time.
The Cash Flows						
	Revenues	Operating Margin	EBIT	EBIT (1-t)	Reinvestment	FCFF
1	\$ 16,462	-7.09%	\$ (1,168)	\$ (1,168)	\$ 1,995	\$ (3,163)
2	\$ 21,730	-2.82%	\$ (613)	\$ (613)	\$ 2,634	\$ (3,247)
3	\$ 28,683	1.45%	\$ 417	\$ 417	\$ 3,477	\$ (3,060)
4	\$ 37,862	5.73%	\$ 2,168	\$ 1,967	\$ 4,589	\$ (2,622)
5	\$ 49,978	10.00%	\$ 4,998	\$ 3,748	\$ 6,058	\$ (2,310)
6	\$ 63,072	10.00%	\$ 6,307	\$ 4,730	\$ 8,729	\$ (3,999)
7	\$ 75,939	10.00%	\$ 7,594	\$ 5,695	\$ 8,578	\$ (2,882)
8	\$ 87,026	10.00%	\$ 8,703	\$ 6,527	\$ 7,391	\$ (864)
9	\$ 94,684	10.00%	\$ 9,468	\$ 7,101	\$ 5,106	\$ 1,996
10	\$ 97,525	10.00%	\$ 9,752	\$ 7,314	\$ 1,894	\$ 5,421
Terminal year	\$ 100,450	10.00%	\$ 10,045	\$ 7,534	\$ 2,260	\$ 5,274
The Value						
Terminal value	\$ 117,192					
PV(Terminal value)	\$ 54,014					
PV (CF over next 10 years)	\$ (12,672)					
Value of operating assets =	\$ 41,342					
Adjustment for distress	\$ 1,034		Probability of failure = 5.00%			
- Debt & Minority Interests	\$ 12,872					
+ Cash & Other Non-operating assets	\$ 2,666					
Value of equity	\$ 30,103					
- Value of equity options	\$ 409					
Number of shares	169.76					
Value per share	\$ 174.92		Stock was trading at = \$360.00			

# The Valuation bottom line in June 2018

- I listed possible, perhaps even plausible, scenarios where Tesla's value per share could be higher than \$400/share, but argued that it would require the equivalent of a royal flush for the company to get there, a combination of a ten-fold increase in revenues, an operating margin of 12% and reinvesting more like a technology than an automotive company.
- Since the stock was trading at close \$360 at the time of the valuation, I concluded that it was significantly over valued.

# Funding Secured?

- The tweet: Elon Musk roiled the waters in August 2018 with his now infamous tweet about funding being secured for a \$420 buyout of the stock, causing a surge in the stock price
- The push back: Questions arose about both how secured the funding actually was and whether the \$420 price itself was fiction.
- In [my post on the topic](#), I argued that if you were a private equity investor interested in taking a company private, Tesla would be a poor target, given its need for capital to keep growing, its heavy debt burden and the presence of Elon Musk as CEO.

# Catching up: The Good News since June 2018

- Revenue Surge: In the drama around production targets and logistical misses, it is easy to lose sight of the fact that the Tesla 3 has caused the company to almost double revenues over the course of the last year, while easily winning the race for best selling electric car in the world.
- Improving Profitability: While Musk's tweets about Tesla turning earnings positive may have been premature, the company has moved down the pathway to profitability, reducing operating losses and with R&D capitalized, perhaps even turning the corner on operating profitability.

# The Bad News

- Debt load and Distress: When Tesla chose to add to its debt burden by borrowing \$5 billion in 2017, I argued that there was no good reason for Tesla to borrow money. Tesla has since added to that debt and in June 2019, that debt, now close to \$14 billion, is revealing its dark side, as a bond price plunge and ratings downgrades threaten to put Tesla's growth story at risk.
- Reinvestment Lags: Growth requires reinvestment, and especially so for automobile companies, where assembly lines and logistical infrastructure need to be put in place for cars to be delivered to customers. It is both frustrating and puzzling that Tesla, a company with a loyal customer base that is willing to wait, has been unwilling to make the investments that it needs to meet the demand. Instead, the company seems to lurch from one production crisis to another one while its CEO muddies the water further by arguing that the company is not just earnings positive but cash flow positive.

# The Gobsnackers...

- SEC Oversight: If there has been a recurring story over the past year, it has to do with the aftermath of Elon Musk's "funding secured" tweet, which led to a SEC investigation and a threat of sanctions on the company. While the company [came to a settlement with the SEC](#), that settlement requires restraint on the part of Musk on future disclosures to the market (especially in the form of tweets), and restraint is not a Musk strong point.
- Autonomous Cars: In April 2019, Musk [unveiled a plan to roll out autonomous taxis](#), with Tesla owners being allowed to add to the network, in the near future, with the promise that Tesla's technology on auto driving was well ahead of the competition. There is a debate worth having about autonomous cars and how they will change the ride sharing business, but it is almost certain that this will not happen smoothly or soon.
- The Rest: This being Tesla, there were the weekly distractions as Musk muddied the waters with talk of [electric leaf blowers](#) and [insurance products](#).



# Updating Tesla's story

- Same story: Bringing together everything that has happened at Tesla over the last year, I find myself telling the same story that I told about Tesla a year ago, of a company that would find a pathway to revenues of \$100 billion in 2028, with strong operating margins, remains intact, with one notable change.
- More danger: The company's debt overhang, already a concern a year ago, has become a clear and present danger to the company. In effect, on an operating basis, the company is and it faces more truncation risk (a chance of failure of 20%).
- A Corporate Teenager? As I watched Musk repeatedly put Tesla's story and value at risk with his distractions, I was reminded of teenagers around the world, with immense potential (and intelligence) who risk it all for a momentary and meaningless rush, leading me to attach the **corporate teenager label** to the company.

***A Teenage Phenom faces growing (up) pains!***

Tesla will grow as a high-end auto company, delivering \$100 billion in revenues in year 10. In the face of stronger competition, Tesla's brand name and better technology will allow it to deliver on profitability (with margins in the 75th percentile of auto firms) and raise enough capital to cover its large reinvestment needs for much of the next decade. While Tesla's operating risk will move towards average over time, its debt burden puts it at risk of default, and that risk has risen to 20%. There is a floor to operating value at \$35-\$40 billion, at which the firm will be attractive as an acquisition target to an auto or (more likely) a large tech firm. Overlying all of this is the danger that Elon Musk will put the company's potential at risk, by either over reaching on product offerings or committing financial malpractice.

***The Assumptions***

	Base year	Years 1-5	Years 6-10		After year 10	Link to story
Revenues (a)	\$ 22,594	30.00%	→ 2.26%		2.26%	
Operating margin (b)	1.98%	1.98%	→ 10.00%		10.00%	
Tax rate	25.00%	25.00%	→ 25.00%		25.00%	
Reinvestment (c)		Sales to capital ratio 2.00		RIR =	22.60%	
Return on capital	1.67%	Marginal ROIC = 24.53%			10.00%	
Cost of capital (d)		7.87%	→ 8.00%		8.00%	

***The Cash Flows***

	Revenues	Operating Margin	EBIT	EBIT (1-t)	Reinvestment	FCFF
1	\$ 29,372	3.58%	\$ 1,053	\$ 1,053	\$ 3,389	\$ (2,337)
2	\$ 38,184	5.19%	\$ 1,981	\$ 1,981	\$ 4,406	\$ (2,425)
3	\$ 45,821	6.79%	\$ 3,112	\$ 3,112	\$ 3,818	\$ (706)
4	\$ 54,985	8.40%	\$ 4,616	\$ 3,751	\$ 4,582	\$ (831)
5	\$ 65,982	10.00%	\$ 6,598	\$ 4,949	\$ 5,498	\$ (550)
6	\$ 76,837	10.00%	\$ 7,684	\$ 5,763	\$ 5,428	\$ 335
7	\$ 86,752	10.00%	\$ 8,675	\$ 6,506	\$ 4,958	\$ 1,549
8	\$ 94,869	10.00%	\$ 9,487	\$ 7,115	\$ 4,058	\$ 3,057
9	\$ 100,379	10.00%	\$ 10,038	\$ 7,528	\$ 2,755	\$ 4,773
10	\$ 102,647	10.00%	\$ 10,265	\$ 7,699	\$ 1,134	\$ 6,564
Terminal year	\$ 104,967	10.00%	\$ 10,497	\$ 7,873	\$ 1,779	\$ 6,093

***The Value***

Terminal value	\$ 106,156		
PV(Terminal value)	\$ 49,594		
PV (CF over next 10 years)	\$ 2,461		
Value of operating assets =	\$ 52,055		
Adjustment for distress	\$ 5,206	Default probability (based on rating) = 20.00%	
- Debt & Minority Interests	\$ 14,658		
+ Cash & Other Non-operating assets	\$ 2,198		
Value of equity	\$ 34,389		
- Value of equity options	\$ 805	32 million options (CEO package & convertibles), deep out of the money right now.	
Number of shares	176.42		
Value per share	\$ 190.36	Stock was trading at = \$185.50	

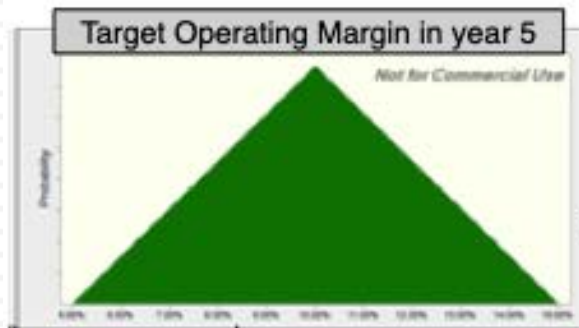
# A Comparison: Tesla in June 2018 vs June 2019

	<i>Jun-18</i>	<i>Jun-19</i>	<i>Reasons for change</i>
<b>Base Year Numbers</b>			
Base year revenues	\$ 12,471	\$ 22,594	Ramped up delivery of Tesla 3s almost doubled revenues
Stated Operating Income	\$ (1,946)	\$ (134)	Improved operating profitability
Adjusted Operating Income (for R&D and leases)	-1418	449	With R&D and leases adjusted, operating profits are positive
<b>Key Value Drivers</b>			
Revenue Growth Rate	23.20%	16.46%	Larger base but same end game
Revenues in 2028	\$ 100,450.00	\$ 100,379.00	No change in base story
Operating Margin	10.00%	10.00%	No change in base story
Year of convergence	5	5	Easier reach
<b>Debt and Capital</b>			
Debt outstanding	\$ 11,875.00	\$ 13,783.00	Debt has increased by almost \$2 billion
Market Cap	\$ 64,041.00	\$ 33,670.00	Market cap has dropped by almost 50%
Debt/Equity	18.54%	40.94%	Debt to Equity ratio naturally has risen
Bond Yield	6.25%	8.20%	Fear of default/distress has surged
Bond Rating	B2	B3	And ratings agencies are following
Cost of capital	8.29%	7.87%	Riskfree rate down from 3% to 2.22%
<b>Valuation of Operating Assets, Equity and per share Value</b>			
Value of Operating Assets	\$ 41,333.00	52048	
Probability of failure	5%	20%	Danger from debt is greater and more imminent
Failure-adjusted Value of Operating Assets	\$ 40,309.00	\$ 46,849.00	
- Debt (with operating lease debt)	\$ 11,875.00	\$ 13,796.00	
- Minority Interests	\$ 997.00	\$ 862.00	
+ Cash	\$ 2,666.00	\$ 2,198.00	
Value of equity	\$ 30,103.00	\$ 34,389.00	
- Employee/Other Options	\$ 410.00	\$ 805.16	Employee options valued using intrinsic value/option pricing
Value of common stock	\$ 29,693.00	\$ 33,583.84	
/ Shares outstanding	169.76	\$ 176.42	
Value per share	\$ 174.91	\$ 190.36	Share count is up, but equity value up more
Price per share	\$ 360.00	\$ 185.50	
Under or over valued	105.82%	-2.55%	Price down..value up.. over to under valued!

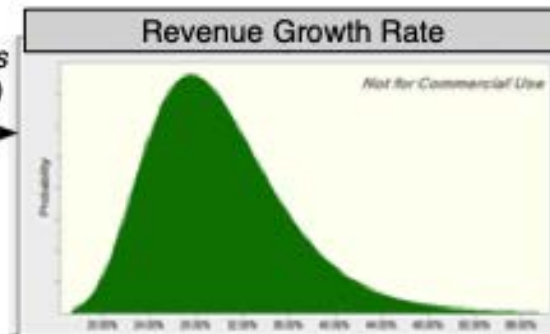


# The Tesla Divergence..

	<i>Base Case</i>	<i>Bull</i>	<i>Bear</i>
Revenue Growth	Electric cars continue make inroads, with Tesla a market leader. Revenues in 2028 = \$100 billion	Most cars sold will be electric and Tesla will dominate the market. Revenues in 2028 = \$200 billion	Electric car growth levels off and Tesla becomes one of many sellers. Revenues in 2028 = \$50 to \$60 billion
Operating Margin	Tesla moves to 75 <sup>th</sup> percentile of auto business, because of brand name and technological edge. Operating margin in 2023 = 10%	Tesla moves to 90 <sup>th</sup> percentile of auto margins, with economies of scale on battery costs. Operating margin in 2023 = 12%	Tesla ends at 25 <sup>th</sup> percentile of auto margins, because of inattention to cost control and factory inefficiencies. Operating margin in 2023 = 5%
Reinvestment	Tesla will reinvest less than the typical auto company, using technology to compensate. Sales to Capital = 2.0	Tesla will reinvest like a technology company, more soft assets than hard ones. Sales to Capital = 2.5	Tesla will reinvest like an auto company, with long delayed investments in assembly lines. Sales to Capital = 1.0
Risk of failure	Moderate, as the company finds a way to navigate through debt payments coming due. Failure rate = 20%	Low, as the company replaces debt with equity (through conversion or new equity issuances) Failure rate = 10%	High, as macroeconomic weaknesses interact with corporate weaknesses. Failure rate = 30%
Value per share	\$190	\$606	\$52



Revenue growth is positively correlated with operating margins (Correlation = 0.4)

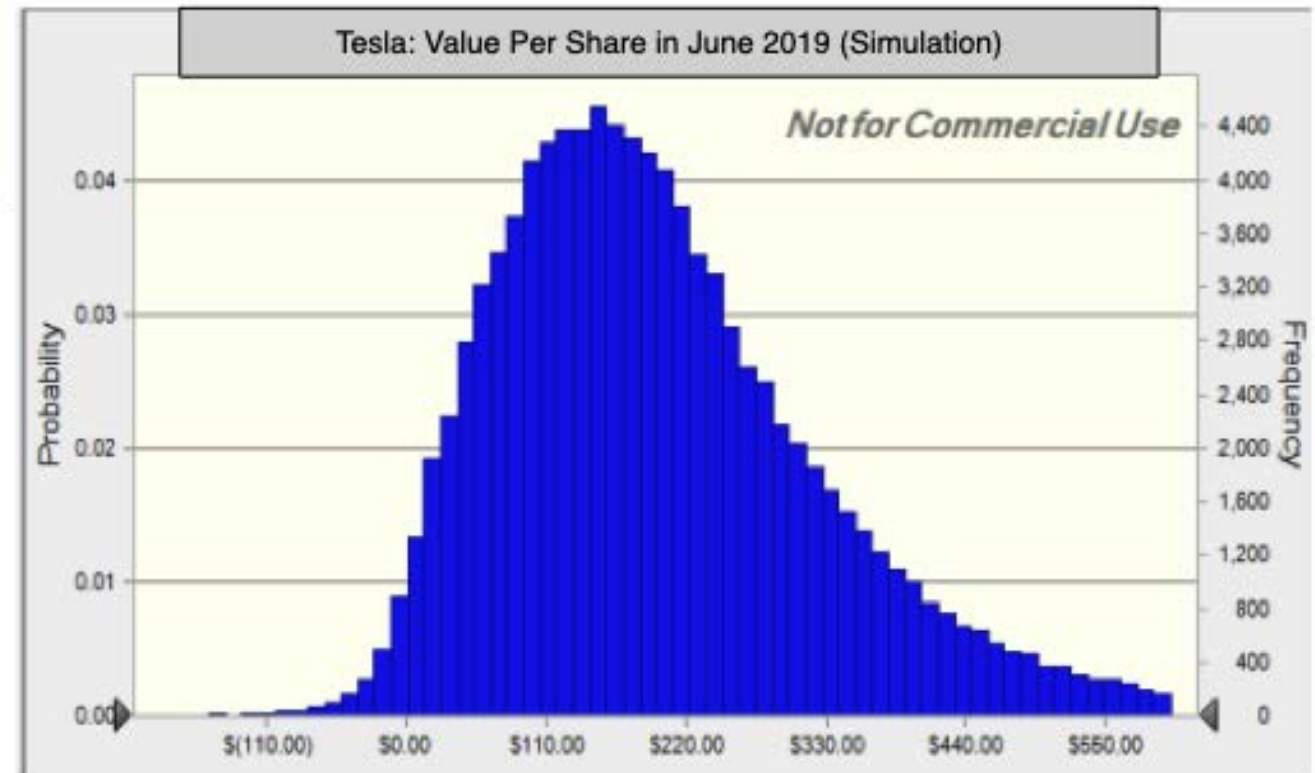
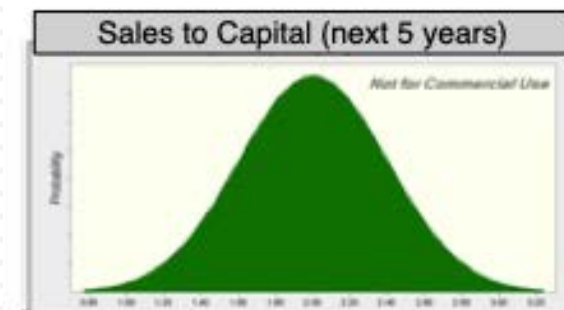
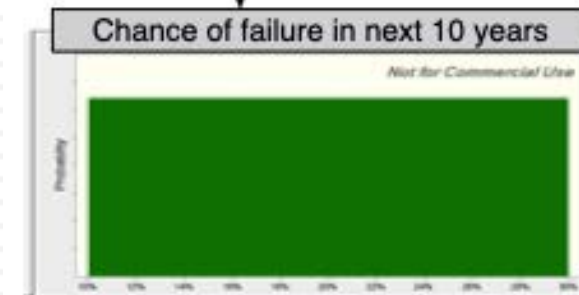


Percentile	Value per share
0%	-\$278.50
10%	\$51.78
20%	\$89.79
30%	\$120.85
40%	\$150.50
50%	\$180.07
60%	\$211.59
70%	\$248.74
80%	\$299.94
90%	\$380.94
100%	\$2,398.33

Lower operating margins increase likelihood of failure (Correlation = -0.5)

**Tesla: Valuation Simulation in June 2019**  
**Stock Price on June 1, 2019 = \$188**

Base Case = \$190.36  
 Base Case with \$60 floor = \$199



# The ARK Pricing of Tesla

	2018	2023 Bull	2023 Bear
<b>Electric Vehicle Business</b>			
Cars Sold ( in millions)	245,240	3,000,000	1,700,000
Revenue (in millions)	\$ 21,461.00	\$ 150,000	\$ 85,000
Gross Profit	\$ 4,042.00	\$ 48,800	\$ 23,850
SG&A	\$ 2,834.00	\$ 15,000	\$ 8,500
R&D	\$ 1,460.00	\$ 15,000.00	\$ 8,500.00
EBIT	\$ (252.80)	\$ 16,600.00	\$ 5,200.00
Net PP&E	\$ 11,330.00	\$ 20,000.00	\$ 15,000.00
Total long term debt	\$ 14,170.08	\$ -	\$ -
Incremental interest paid		\$ 1,948.39	\$ 1,948.39
EBITDA R&D	\$ 3,108.20	\$ 33,800.00	\$ 15,350.00
<b>Autonomous Mobility as a Service Business</b>			
<b>Taxis</b>			
Fully Autonomous Capable Fleet (not in millions)		7,200,000	0
% of Teslas on platform		70%	0
Gross Autonomous Billings		\$ 585,144.00	\$ -
Cash from autonomous		\$ 52,160.34	\$ -
<b>Pricing</b>			
EV/EBITDAR&D for Auto		8.00	8.00
EV/EBITDAR&D for MaaS		14.00	14.00
Enterprise Value		\$ 1,313,607	\$ 122,800
Market Cap		\$ 1,398,961	\$ 124,000
Equity Raise		\$ 20,000	\$ 10,618
Shares Outstanding	178.19	229.10	207.77
Stock Price	\$ 195.00	\$ 6,106.29	\$ 596.83

# The ARK Tesla Pricing

- This is a pricing, not a valuation: An intrinsic valuation requires forecasting cash flows over time, after taxes and reinvestment, and then discounting those cash flows back at a rate that reflects the risk in the investment. ARK's basic model forecasts revenues, earnings and other metrics in 2023, and applying a multiple to their estimated EBITDAR&D in 2023.
- The bear is frisky: The ARK bear case requires that Tesla will sell 1.7 million cars in 2023, at an average price of \$50,000/car and generate an operating margin of 6.1% on those revenues. Each of these assumptions is plausible, and the combination is possible, though to call a seven fold increase in revenues over five years, with a concurrent improvement to industry average profitability, a bear case.



# The Weakest Link: Reinvestment and Cash Flow

	2018	2023 Bear	Change in Bear Case: 2018-23
Cars Sold ( in millions)	245,240	1,700,000	1,454,760
<b>Revenue (in millions)</b>	<b>\$21,461.00</b>	<b>\$ 85,000</b>	<b>\$ 63,539.00</b>
Gross Profit	\$ 4,042.00	\$ 23,850	\$ 19,808.00
SG&A	\$ 2,834.00	\$ 8,500	\$ 5,666.00
R&D	\$ 1,460.00	\$ 8,500.00	\$ 7,040.00
<b>EBIT</b>	<b>\$ (252.80)</b>	<b>\$ 5,200.00</b>	<b>\$ 5,452.80</b>
Net PP&E	\$11,330.00	\$ 15,000.00	\$ 3,670.00
Working Capital		\$ 1,200.00	\$ 1,200.00
Change in Invested Capital			\$ 4,870.00
Total long term debt	\$14,170.08	\$ -	\$ (14,170.08)
<b>EBITDA R&amp;D</b>	<b>\$ 3,108.20</b>	<b>\$15,350.00</b>	<b>\$ 12,241.80</b>
Marginal Sales/ Inv Capital			13.05
Marginal ROIC			111.97%



# Flowing into share count...

- Not enough capital raised: ARK does allow for an equity capital raise of \$10.6 billion, but reduces the impact on share count by assuming a stock price of \$360/share (market cap will be \$70 billion) at the time of the raise.
- At too high a price? Since this capital will have to be raised soon, there is an element of wishful thinking here, the stock prices will double in short order and the capital raise will follow.
- Option overhang: If stock prices do climb, as ARK assumes there will there is an overhang of 22 million options that have been granted to Musk by the board of directors that will become actual shares. In short, for the ARK bear case to unfold, the share count will have to double over the next five years.

# The ARK pricing: Summing up

- The bear case: Even if you take the ARK bear case as realistic, with Tesla projected to sell 1.7 million cars in 2023 and earn operating margins close to the auto sector, the pricing per share that you get will be closer to \$200-\$250/share, with a more realistic share count and time value adjustments, not the \$560 that you see on the ARK spreadsheet.
- The bull case: I will leave it untouched, since it is more fairy tale than valuation, a world where there will be 7.2 autonomous cars are on the road in 2023, with Tesla controlling a 70% market share, and generating \$52 billion in annual cash flows. I am willing to accept the argument that Tesla is closer to mastering the autonomous car technology than its competitors, but I see a business that is further in the future than 2023, less dominated by Tesla and much less profitable than ARK does. In short, right now, it is more option than cash flow value added right now.

# My bottom line

- I've been wrong on Tesla before: I did my first valuation of Tesla in 2013, and undershot the mark, partly because I saw its potential market as smaller (luxury autos) and partly because I have underestimated how much it would be able to extract in production from the Fremont plant.
- And I have tried to correct: Over time, I have compensated for both mistakes, giving Tesla access to a bigger (albeit still upscale) market and more growth, while reinvesting less than the typical auto company.
- A Turning Point? In spite of these adjustments, I have consistently come up with valuations well below the price, finding the stock to be valued at about half its price only a year ago. This year marks a turning point, as I find Tesla to be undervalued, albeit by only a small fraction. Even in the midst of my most negative posts on Tesla, I argued that I like the company and that I would one day own the stock. That day may be here, as I put in a limit buy order at \$180/share knowing fully well that like my children in their teenage years, this company will test my patience and sanity.